

WHAT IS CLAIMED IS

1. A table searching method, the method comprising the steps of:
providing at least one memory unit having a table of information including a plurality of data entries;
providing a plurality of searching agents each being communicatively coupled
5 with said memory unit, each of said searching agents receiving an associated search value;
receiving at least one table entry from said plurality of data entries, broadcast by said at least one memory unit, by each of said agents; and
processing said at least one table entry by each of said searching agents to
10 determine if a match occurs between the associated search value and the at least one table entry.
2. A table searching method as recited in claim 1 wherein said step of providing at least one memory unit comprises providing at least one memory unit having a plurality of tables and said step of receiving at least one table entry comprises receiving said at least one table entry and a table address associated with
5 a selected table of said plurality of tables.
3. A table search method as recited in claim 1 wherein said step of receiving at least one table entry comprises receiving multiple table entries at the same time and said step of processing said at least one table entry comprises comparing the multiple table entries with the associated search value.

4. A table search method as recited in claim 1 wherein said step of receiving at least one table entry comprises each of said plurality of search agents receiving said at least one table entry at the same time.

5 5. A table search method as recited in claim 1 wherein said step of receiving at least one table entry comprises a first search agent of said plurality of search agents receiving said at least one table entry and the first search agent passing said at least one table entry to a next search agent such that all of the plurality of search agents receive said at least one table entry in turn.

6. A table searching method as recited in claim 1 wherein in said processing step each of said searching agents determines said match as an associated best matching of a plurality of table entries in accordance with a longest prefix match searching process.

7. A table searching method as recited in claim 1 wherein in said processing step each of said searching agents determines said match as an associated best matching of a plurality of table entries in accordance with a policy match searching process.

8. A table searching method as recited in claim 1 further comprising the steps of:

providing a controller unit that controls said memory unit; and

providing a series of memory address values to said memory unit by said

5 controller unit,

wherein said memory unit responds to said memory address values, and table entries received by each of said agents are based on said memory address values.

9. A table searching method as recited in claim 5 wherein each of said agents is communicatively coupled with said controller unit and each of said agents provides a search enable signal to said controller unit in response to receiving said associated search value, said step of providing said series of memory address values
5 occurs in response said search enable signal by at least one of said agents.

10. A table searching method, the method comprising the steps of:
providing at least one memory unit having a table of information including a plurality of data entries;
providing a plurality of searching agents each being communicatively coupled
5 with said memory unit, each of said searching agents receiving an associated search value; and
broadcasting at least one table entry from said plurality of data entries by said at least one memory unit to each of said agents;
wherein each of said searching agents determines if a match occurs between
10 the associated search value and the table entry.

11. A table search method as recited in claim 10 wherein said step of broadcasting at least one table entry comprises broadcasting multiple table entries at the same time and said searching agents determines if a match occurs between the multiple table entries and the associated search value.

12. A table search method as recited in claim 10 wherein said step of broadcasting at least one table entry comprises broadcasting to each of said plurality of search agents said at least one table entry at the same time.

13. A table search method as recited in claim 10 wherein said step of broadcasting at least one table entry comprises providing a first search agent of said plurality of search agents with said at least one table entry and the first search agent passing said at least one table entry to a next search agent, such that all of the
5 plurality of search agents receive said at least one table entry in turn.

14. A table searching method as recited in claim 10 wherein said step of providing at least one memory unit comprises providing at least one memory unit having a plurality of tables and said step of broadcasting at least one table entry comprises broadcasting said at least one table entry and a table address associated
5 with a selected table of said plurality of tables.

15. A table searching method as recited in claim 10 wherein in said searching agents determines said match as an associated best matching of a plurality of table entries in accordance with a longest prefix match searching process.

16. A table searching method as recited in claim 107 wherein in said searching agents determines said match as an associated best matching of a plurality of table entries in accordance with a policy match searching process.

17. A table searching method as recited in claim 10 further comprising the steps of:

providing a controller unit that controls said memory unit; and

providing a series of memory address values to said memory unit by said

5 controller unit,

wherein said memory unit responds to said memory address values, and table entries broadcast to each of said agents are based on said series of memory address values.

18. A table searching method as recited in claim 17 wherein each of said agents is communicatively coupled with said controller unit and each of said agents provides a search enable signal to said controller unit in response to receiving said associated search value, said step of providing said series of memory address values
5 occurs in response said search enable signal by at least one of said agents.

19. A table searching system comprising:

a memory unit for storing a table of information including a plurality of data entries each having data contents;

a plurality of searching agents each being communicatively coupled with said
5 memory unit, and having a port for receiving an associated search key value; and

a memory controller unit providing a centralized interface between said memory unit and each of said agents, said controller unit being operative to control said memory unit to broadcast the contents of a current one of said table entries to each of said agents during each of a plurality of cycles of operation;

10 each of said searching agents being operative to determine an associated best matching one of said data entries based on comparisons between said associated key value and the contents of said data entries broadcast by said memory unit.

20. A table searching system as recited in claim 19 wherein said memory unit comprises a static random access memory (SRAM) unit.

21. A table searching system as recited in claim 19 wherein each of said searching agents is operative to determine said associated best matching one of said data entries in accordance with a longest prefix match searching process.

22. A table searching system as recited in claim 19 wherein each of said searching agents is operative to determine said associated best matching one of said data entries in accordance with a policy match searching process.

23. A table searching system as recited in claim 19 wherein said controller unit controls said memory unit by providing a series of memory address values to said memory unit, and wherein said memory unit is responsive to said memory address values, and operative to broadcast the contents of one of said table
5 entries to each of said agents during each of said cycles.

24. A table searching system as recited in claim 23 wherein each of said agents is communicatively coupled with said controller unit for providing an associated one of a plurality of search enable signals to said controller unit, each of said agents

being operative to assert said associated enable signal in response to receiving said
5 associated search key value, said controller unit being operative to provide said series
of memory address values to said memory unit in response to at least one of said
search enable signals being asserted.

25. A table searching system as recited in claim 19 .wherein each of said
agents further comprises:

a comparison logic unit for receiving said associated search key value, and for
receiving said contents of said table entries provided by said memory unit;

5 a data register communicatively coupled with said comparison logic unit;

a match quality register communicatively coupled with said comparison logic
unit, said quality register for storing temporarily selected match quality values
associated with temporarily selected ones of said entries;

said comparison logic unit being operative during each of said cycles to
10 perform a best match table searching process including the steps of,

comparing said associated key value to a selected portion of the
contents of said current entry to determine whether there is a current match,
and

if a current match is determined between said associated key value and
15 said selected portion of said contents of said current entry ,

determining a current match quality value associated with said
current entry , said current match quality value being indicative of a
quality of said current match,

comparing said current match quality value to a previous
20 temporarily selected match quality value stored in said match quality

register. to determine if said current match is a more desirable match than a match associated with said previous temporarily selected match quality value, and

25 if said current match is a more desirable match than a match associated with said previous temporarily selected match quality value, replacing the contents of said match quality register with said current match quality value, and

replacing the contents of said data register with the data contents of said current entry.

26. A table searching system as recited in claim 25 wherein:

said table of information is a policy match table;

each of said data entries includes key fields for storing associated stored key values and mask value fields storing associated mask values; and

5 said searching process includes comparing an unmasked portion of said associated received key value to an unmasked portion of said stored key value of said current entry , each of said unmasked portions of said received key value and said stored key value being defined by masking a number of least significant bits indicated by the mask value of said current entry.